Environmental Awareness Training

Asbestos
Awareness Training

USAG Heidelberg
DPW-Environmental Division

Environmental Awareness Training

Asbestos

1. Characteristics and use
2. Health effects
3. Investigation and risk assessment
4. Abatement and disposal
5. Heidelberg Garrison's asbestos management
6. Brake Pad Training Video

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1. Asbestos – characteristics and use

Asbestos – the mineral

- Group of naturally occuring silicate minerals of microscopic fiber structure
- 2 main groups due to mineralogical structure and chemical composition:
  - Serpentine asbestos: Chrysotile (white asbestos): $Mg_3Si_2O_5(OH)_4$
  - Amphibole asbestos: Krokydolithe (blue asbestos), Amosite (brown asbestos)

Characteristics

- Heat-resistant, fire-proof
- Chemical resistance
- Electrical and thermal insulating capability
- High tear strength
- High flexibility and tensile strength
- Relatively inexpensive to install

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1. Asbest – characteristics and use

Classification

- **Asbestos cont. materials (ACM): >0.1% (TRGS 519) vs. 1% (AHERA/OSHA) asbestos**
- **Friable ACM: Density <1000 mg/kg:**
  - **Sprayed-on asbestos, cardboard, plaster, lightweight panels etc.**
- **Asbestos cement products: Density >1400 mg/kg und asbestos content <15 %**

Use

- **Floor tiles, wall, ceiling and facade panels, roofing material, window sills etc.**
- **Contained in more than 3000 products, especially in the construction industry:**
  - **Fireproofing and insulation material (heat, noise and humidity protection)**

History of asbestos use

- **Used for the last 4000 years**
- **Germany: Intensively used since the 1950s; reduction since 1980; 1990s prohibition**
- **Exception: Demolition, removal and maintenance work (TRGS 519)**

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2. Asbestos – health effects

Problem

- **Microscopic fiber structure: D<3 µm; L>5 µm; L:D>3; respirable fibers according to WHO**
- **Biological resistance: >100 years**
- **Definitely carcinogenic (K 1 classification IAW TRGS 905); no toxicolog. action level**

Possible effects

- **Inhalation of airborne fibers vs. ingestion of contaminated drinking water**
- **No acute toxic effects; latency of 15-40 years**
- **Risk depends on dose and exposure**
- **Fibrogenic effects: Development of scar tissue (asbestosis)**
- **Carcinogenic effects: Cancer development (lung cancer, mesothelioma: cancer of the pleural lining)**

- **The mere presence of asbestos containing products doesn‘t represent a health risk, the possible release of asbestos fibers in the room air is critical.**

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3. Asbestos – investigation and risk assessment

Asbestos inventory

- **Identifying and localizing all asbestos containing materials in buildings**
- **Establishing, maintaining and evaluating the asbestos data base**
- **Building inspections by media experts**
- **Bulk and wipe sampling; air monitoring (if required); microscopic analysis**

Evaluation

- **Friable ACM IAW German Asbestos Guidelines**
- **Assessment of abatement urgency according to the following criteria:**
  - **Type of asbestos used (sprayed-on asbestos, plaster, panels etc.)**
  - **Mineralogical type of asbestos**
  - **Surface structure and condition (damages, deteriorations)**
  - **Product disturbance (vibration, air flow etc.)**
  - **Room use (frequency, kids)**

- **Immediate abatement/temporary meassures vs. re-assessment every 2/5 years (max.)**

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4. Asbestos – abatement and disposal

Abatement options

- **Removal: Non-destructive removal in wet condition**
- **Encapsulation: Surface sealing by a chemical agent to prevent any fiber release**
- **Enclosure: Airtight barrier around the ACM to contain any fibers**

Abatement design and organization (TRGS 519)

- **Demolition and abatement by authorized companies (§ 37 GefStoffV)**
- **Notification of ACM handling prior to project execution**
- **Work plan (type, scope, and duration of work, protective measures, disposal)**
- **Standard operating procedures, workers‘ briefing IAW TRGS 555**
- **Personnel requirements (trained personnel, certified supervisor)**
- **Medical surveillance examinations ref respiratory protection and asbestos containing dust IAW BGV A 4**
- **Restrictions on employment (no teenagers, no pregnant or breast feeding women)**

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4. Asbestos – abatement and disposal

Technical & organizational protection measures

- Work area preparation (black/white area)
- Containment including critical barriers as well as personnel and waste load-out
- Negative air within the work area, exhaust air filtering (class S or HEPA filters)
- Non-destructive dismantling of ACM in wet condition
- Waste packaging in appropriate, secured and labelled big bags
- Comprehensive cleaning of all surfaces (K 1 or HEPA vacuum-cleaners)
- Final clean up followed by certified expert‘s inspection (visual control)
- Residual fiber lock-down
- Final clearance testing (air monitoring IAW VDI 3492, 2: <500 fibers/m³)

Personal protective equipment (PPE)

- Disposable suits including hood, gloves and boots
- Respiratory protection: Full face or half face masks with P2/P3 filters or HEPA filters
- Training how to use, maintain and dispose of your PPE

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4. Asbestos – abatement and disposal

Substitutes: Artificial mineral fibers (AMF)

- Man-made silicate mineral fibers of different chemical composition
- Installation of AMF products as asbestos substitute since 1980s
- Approx. 95% mineral wool products (glas, stone and slag wool): Insulation
- Approx. 5% ceramic fibers: Electrical insulation
- Characteristics: Fire proof, good insulation effects (heat, noise, fire protection)

Health risks

- Potential carcinogenic effects depend on fiber struc and biological persistence in the body
- Carcinogenic potential: Asbestos fibers > ceramic fibers > mineral wool fibe
- Determination of the carcinogenic index IAW TRGS
- Skin and eye irritations
- Legal requirements ref handling AMF: TRGS 521

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Asbestos Program Management

Main management elements

- **Identification of all ACM (community wide) as well as risk assessments**
- **Re-surveys and re-assessments of products and their condition**
- **Information of buildings occupants and personnel**
- **Work order/service order control system (project monitoring/supervision)**
- **Recommendations concerning the handling of hazardous materials**
- **Training**

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